

## RS-19 HISTORY OF DEVELOPMENT

DW R  
 Tharf  
 File 2D-110-TO6  
 DR1

1. Contract initiated 20 June 1957 and to run for 18 months, cost \$97,401.61  
 Program layed out into two phases
2. Phase A. Delivery of RS-19 prototype system effected on 17 July 1958 to  
 demonstrate feasibility of the basic design concepts.

## NOTE:

- a. System consists of FM Transmitter, FM Receiver,  AM Retransmitter,  Battery Charger. 25X1  
25X1
- b. Investigations were conducted for optimum frequency and Antenna selection.  
 Through 3.5  $\mu$  to 7 mc provided greater range of communication than 14 mc,  
 35 mc and 156 mc.
- c. Modulation Selection - Single sideband - FM and AM techniques  
 Considering all problems - battery drain and life, range, size of equip-  
 ment, simple circuitry, ease of operating and reliability, FM was selected.
- d. Audio Transducer Development - Air approach - air core audio transformer  
 2 watts required in primary to develop 1 mw in the mouth receiver, - efficiency  
 of this system was very poor.  
 Second approach - re-transmit audio to mouth 330 kc AM transmitter -  
 efficiency was good.

FM Receiver - 2 RF stages, mixer, crystal controlled OSC. L-C-455 kc  
 bandpass, filter, six IF amp. one limiter, discrimination, two audio amp.  
 SQUELCH circuit. 6 volt battery pack.

Size - 2" x 4.6" x .8"

Weight - 6.25 ozs.

Sensitivity - 35 mv or less for 20 db quieting ~~operating time~~

Operating Time - 24 hours squelched  
 12 hours unsquelched

330 kc retransmitter draws power from receiver

Battery pack - 25 ma.

Size - .75 x .8 x 4.6 inches

Weight - 1-3/4 ozs.

Operating Time - 24 hours squelched  
 2 hours unsquelched

35

DOC 49	REV DATE 14 Feb	BY 018373
ORIG COMP 33	ORI 56	TYPE 02
ORIG CLASS 5	PAGES 4	REV CLASS C
JUST 22	NEXT REV 2010	AUTH: HQ 70-25X1

Detector diode

Transistor Audio Amp.

Transducer (what is)

Loop Antenna

Battery Life - 16 hours under signal conditions

FM Transmitter 6.980 MC  $\pm 4$  KC deviation

Size: 7.5 x 4.5 x 1.375 inches

Volume: 47 cubic inches

Weight:  $2\frac{1}{4}$  lbs.

Power out:  $2\frac{1}{4}$  watts

Battery Life: 30 minutes

Voice modulated

Audio tone modulated (last two audio stages connected into oscillator by feed back line 1000 cycle tons.)

3B4 final amplifier includes 2 watts RF

DC-to-DC converter: 12 volt battery pack

#### PHASE B

1. Complete transistorization
2. Improve design (reduce size)
3. Battery packs separation from electronics but still contained in individual equipment case.
4. 2 watts RF output using two Fairchild 2N696 transistors in parallel.
5. Battery voltage for transmitter is 30 volts. This is necessary to obtain 2 watts RF output and also eliminate DC-to-DC converter.
6. Telex contract for mouthpiece development \$9,800 10 units plus 2 prototypes.

25X1

Transmitter size approximately  $5\frac{5}{8}$ " x  $2\frac{7}{8}$ " x  $1\frac{1}{8}$ "

Receiver same size as Phase A

Delivery date: 1 April - 2 transmitters - 1 receiver, 1 remote control, 1 mouth receiver.

We are to send  one of the Phase A FM receivers for ~~x~~ returning and possible repair - This will then give us a complete set in which to operationally test the prototype of Phase B. Battery transmitter one-half hour. Receiver 24 hours. Charge: 19 hours.

25X1

Battery Charger - Magnetic amplifier regulated power supply

Operates from -70 to 270 VAC 40-60 cycle.

Two position switch (70-135 VAC) 135-240 VAC)

This equipment will regulate up to 300 VAC as noted by tests at contractor. consists of a saturable reactor, power transformer, bridge rectifier and control circuit.

Charging rate: constant current

Transmitter 12V at 36 ma - 22 hrs.

Receiver 6 V at 9 ma - 18 hrs.

rechargeable nickel-cadmium batteries can be charged in excess of 90 days without harmful effect.

~~SECRET~~

CONFIDENTIAL

~~CONFIDENTIAL~~  
~~CONFIDENTIAL~~

#### Test Equipment

used to tune loading coils of the transmitter and receiver

switch in transmit position acts as an absorption meter for tuning transmitter loading coil.

Switch in receiver position, generates a signal 6.980 mc for loading coil of receiver 18" antenna

#### Cost and Availability of RS-19:

Tube: 1108 each

Transistor 1318 each  
delivery 6-9 months.

} for 100

telix price  
three ant.

~~SECRET~~

CONFIDENTIAL

~~SECRET~~

## RS-19

### BASE RADIO STATION

This equipment consists of a transmitter and receiver with two separate power supplies. 1. DC-to-DC Converter and 2. AC Power Supply.

Emission designation is F-2 (tone CW) and F-3 (Voice)

Transmitter characteristics      Keying - Hand speed and upto 300 wpm w/external equip.

Size - ~~2 1/2~~ 8 x 6 x 2 1/2 inches approx.

Weight- ~~Max~~ approx 10 lbs.

Power output, 25 watts RF

Frequency range - same as RS-19 field unit  
necessary for

Controls - Minimum amount ~~and to be consistent with operation~~ simplicity of  
operation.

Antenna - Whip with base mount.

Operation - mobile and fixed location.

Crystal controlled with six crystal positions provided.

### Receiver Characteristics

Size - 8 x 6 x 2 1/2 inches approx.

Weight - Approx. 10 lbs

Sensitivity - better than the FM receiver of the field unit (RS-19)

Crystal control - Six crystal positions are available

Tuning - One tuning control will be provided for tuning the RF states of the  
receiver.

Internal speaker provided

controls - volume control, squelch control, ON/OFF power control.

Output jacks - Audio output in which a actuating device may be ~~connected~~ connected.

~~SECRET~~ for controlling the ON/OFF function of a tape recorder.

### Power supply

AC Power supply - operating ac voltages are 110/220 volts ac, 50/56 cycles  
will deliver dc operating voltages to transmitter and receiver.

DC-to-DC converter - Operating from 12 volts DC supplying dc operating voltages